

### **REMARKS**

The Office Action of April 7, 2004, has been carefully considered.

It is noted that claims 9-19 are rejected under 35 U.S.C. §112, first paragraph.

Claims 9-19 are further rejected under 35 U.S.C. §102(b) over the patent to Cullen et al. '049.

From Applicant's reading of the Office Action, it is believed that the Examiner is still not quite clear on what the presently claimed invention covers.

The present invention does not deal with a method for cleaning a catalyst system. Instead, the invention is directed to a process for detecting the state of the catalyst system, namely whether or not the catalyst is operating without fault. Thus, the present invention does not deal with cleaning a catalyst, namely, the temporary or sporadic increase of the catalyst temperature or the temporary switching on of a specific operation (lean/rich) of the engine for the purpose of cleaning the catalyst, as is needed by Cullen. Instead, the present invention carries out a good/bad diagnosis of the catalyst.

For accomplishing this, three essential steps are carried out, namely, during a predetermined time period at least one operating parameter of the catalyst system is measured. The operating parameter can, for example, be either the catalyst temperature or an amount of a certain gas present in the exhaust gas (this is recited in claim 17).

As a second step, the total energy output of the internal combustion engine is determined within the predetermined time period. In connection with this step, the Examiner states that there is no clear disclosure of this in the specification. In response thereto, Applicant directs the Examiner's attention to page 6 of the translation of the specification beginning on line 14 where it reads "[I]n addition, the total energy output of the internal combustion engine 16 is also measured over the predetermined time period, ...". Thus, it is respectfully submitted that subject matter found in claim 9 is described in the specification to an extent sufficient to enable one skilled in the art or with which it is most nearly connected, to make and/or use the invention. This step determines the entire energy of the engine during the predetermined time period so that one can speak of an energy interval. This does not deal with instantaneous work, but instead deals with total energy that the engine is giving off during the time period.

In the third step of the invention, a characteristic value K is determined based on a ratio of the operating parameter to the total energy output. The characteristic value determines

whether the catalyst is in proper operating condition or requires cleaning. Once again, the invention does not deal with the steps of cleaning, this can be accomplished through known methods. Instead, the present invention deals with determining what the condition or state of the catalyst is.

It is respectfully submitted that Cullen et al. '049 does not disclose such a process. Cullen et al. do not deal with determining a good or bad condition, but instead deal with cleaning steps that are initiated when the functionability of the catalyst decreases. How this decrease is determined is not disclosed by Cullen et al. Particularly instructive in this connection is column 4, beginning at line 21 wherein Cullen et al. only state that as the efficiency decreases, the purging of the trap and thus cleaning of the catalyst occurs more frequently. Nowhere do Cullen et al. state how this decrease in the efficiency, i.e., the condition of the NO<sub>x</sub> trap, is detected.

As indicated in lines 41-54 in column 1 of Cullen et al., the cleaning steps involve a temporary increase in the temperature of the trap to between 1500 and 1600F. Lower temperatures do not lead to the desired cleaning effect, and higher temperatures degrade the trap. Thus, the temperature of the trap must be exactly determined and controlled. According to line 50 of column 1, sensors have been provided to monitor and control the trap temperature. Cullen et al. state that this is, however, expensive and they intend to provide a less costly method of determining trap temperature during the cleaning process.

In a discussion of Cullen et al. on page 3 of the Office Action, the Examiner states that Cullen et al. disclose a method for detecting the condition or state of a catalyst system. Applicants do not find support for such a position in the passages of Cullen et al. cited by the Examiner. Instead, Cullen et al. disclose estimating and controlling the trap temperature during cleaning of the catalyst. Furthermore, Cullen et al. do not disclose detecting an operating parameter over a predetermined time period and determining total energy output of the engine within the predetermined time period. In Cullen et al. the determination of temperature does not take place over a predetermined time period, but instead continues for as long as needed until the catalyst is cleaned.

The Examiner cites column 6, lines 1-60 of Cullen et al. for teaching the determination of total energy output of the engine within the predetermined time period. Applicant can only guess that the Examiner is referring to line 35 of column 6 which discusses engine air mass flow. There is, however, no disclosure of determining total energy output within a predetermined time

period. Instead, Cullen et al. teach an instantaneous value. Finally, Applicants also do not see where Cullen et al. teach the calculation of a characteristic value based on a ratio of the operating parameter to the total energy output. Applicants wish to point out that this ratio has nothing to do with the air/fuel ratio as is mentioned on line 52 of column 6 of Cullen et al.

Additionally, the air mass flow of Cullen et al. is referred to in units of Kg/min (see column 6, line 35). Thus, it is clear that this is a flow rate and not an energy output over a predetermined time period.

Commenting now on the Examiner's statements found in the first paragraph on page 5 of the Office Action regarding the total energy output, Applicant refers the Examiner to the paragraph beginning on line 4 of page 3 of the specification of the present application where it is stated that "the total energy output of the internal combustion engine can be detected in a manner known in and of itself by the use of suitable sensors and made available by an engine control unit as a measurement signal." It is furthermore known that the energy output of the engine can be determined by specific sensors, and for the same purpose the cumulative air quantity can be determined. This utilizes the known concept that the power can be controlled by influencing the input air quantity. This is the common method in which an automobile that is driven by an internal combustion engine is controlled by changing the position of a throttle flap in the air intake so that more or less air is allowed in and thereby the power output is controlled. Thus, if all of the remaining parameters are constant, the throttle flap position and the corresponding air quantity are a value for the power given off. This is conventional knowledge in the art and if desired by the Examiner the Applicant can provide text books which deal with this concept.

It is respectfully submitted that the subject matter contained in the claims is described in the specification in such a way as to enable one skilled in the art to which it pertains or with which it is most nearly connected, to make and/or use the invention. It is further respectfully submitted that Cullen et al. does not disclose the invention recited in the claims.

In view of these considerations, it is respectfully submitted that the rejection of claims 9-19 under 35 U.S.C. §112, first paragraph, and the rejection of claims 9-19 under 35 U.S.C. §112, first paragraph, and the rejection of claims 9-19 under 35 U.S.C. §102(b) are overcome and should be withdrawn.

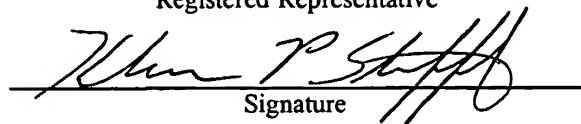
Reconsideration and allowance of the present application are respectfully requested.

In the event the actual fee is greater than the payment submitted or is inadvertently not enclosed or if any additional fee during the prosecution of this application is not paid, the Patent Office is authorized to charge the underpayment to Deposit Account No. 15-0700.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 1, 2004:

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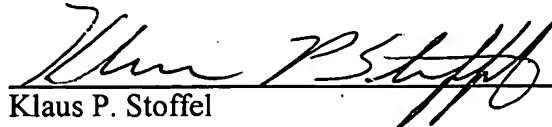
  
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Respectfully submitted,

  
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